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Industrial Finishing

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With the Editor

NOVEMBER—when governors of states throughout the U. S. A. issue their annual proclamations declaring the last Thursday of the month a holiday for the giving of thanks—THANKSGIVING—at this appropriate time the publishers of INDUSTRIAL FINISHING wish to express sincere thanks to readers, contributors and advertisers for their support, co-operation and well wishes expressed in various ways during the past 12 months.

November is INDUSTRIAL FINISHING'S birthday—our first birthday. With November issue we start Vol. II, No. 1. We hope to build Vol. II bigger and better and thereby render greater service to readers and advertisers.

Naturally we want to continue to merit more indorsement of the kind that has just come to our desk, voluntarily, from the foreman finisher of the Angelus Furniture Mfg. Co., Los Angeles, California, who says:

"Filling an important place in the finishing industry, INDUSTRIAL FINISHING should come regularly into the hands of all engaged or interested to any extent in finishing.

"Based upon an experience of upwards of 25 years in the finishing field, I thoroughly enjoy reading its up-to-the minute columns.

"Well gotten up, thoroughly practical, brimful of information, and to the point, it is truly the finisher's right-hand man; any of its practical suggestions, if made full use of, should be of big profit, and should materially lighten the ever-increasing production problems in any finishing room. Let success and more power be with you."

In a postscript this foreman finisher adds: "It might interest you to know that I have taken full advantage of the advertisements therein listed, in each case advising the firm where I noticed the advertisement."

Indeed, we are thankful.

W. H. Rohr

Managing Editor

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VARNISHES - ENAMELS - LACQUERS - JAPANS

To Prevent Lacquer Blushing

General Manager of Eureka Pneumatic Spray Co. calls attention to problems confronting users of modern lacquers, reveals some of the causes and tells how to remedy them

By W. J. Smart

SINCE the first production of air-drying cotton lacquers and lacquer products, there has been probably nothing which has given users so much trouble as the so-called blushing, fogging or smoky-appearing surface which occurs on the work, mainly during the summer months. This also occurs with other solutions used in industrial finishing, though probably to a lesser extent.

Moisture in Atmosphere

Moisture is at all times present in the atmosphere. Such instruments as the thermometer will tell the story. For instance: A day in summer which may appear abnormally hot will not register on the thermometer as hot perhaps as the preceding day, which was in reality five or six degrees hotter, yet it did not feel so hot.

The oppressive feature of what we call a hot day is the excessive moisture in the atmosphere. This is called humidity. It is this moisture beyond any question which causes the smoky appearance on the freshly-finished work.

A Refrigerating Influence

Compression of air always creates frictional heat. Expansion of air under pressure, being discharged through an orifice, is quite the reverse, creating cold to the extent or height of the compression. This chills the surface being finished.

Also the solvents of lacquers and other solutions, being more or less volatile, create additional cold, by evaporation on the surface being finished. This joint refrigerating influence tends to condense the moisture in the atmosphere, depositing it with the finishing solution on the freshly-finished surface, with the inevitable result that the moisture so deposited "milks", or turns the surface cloudy.

An Interesting Test

The writer has tested with a sheet of metal, blowing a volatile lacquer on same on a very humid day, and found that these joint refrigerating influences would condense the atmospheric moisture on the underside of said sheet of metal, where it would form in drops.

It is, of course, indisputable that if the surface becomes cold enough to condense the atmospheric moisture on the underside of the sheet of metal, that it will likewise condense the moisture on the side being finished, though the moisture on that side will remain mixed with the solution, afterwards turning it milky.

We have all noticed, at times, moisture forming on the outside of a water pipe on humid days. Sometimes this has been mistaken for a leak. The reason, of course, is that the pipe being cold, it condenses the atmospheric moisture, which forms in drops on the cold surface. This is exactly what gives the trouble with spray finishing.

Drainage and Filteration

In overcoming this trouble, the first requisite is that the pipe should be either galvanized or brass. Secondly, all overhead piping should be hung with the far end slightly higher than the end toward the air-receiving tank. This permits drainage of condensation, which inevitably occurs in the overhead pipe line, back to the air tank where it can be drawn off at the cock provided on the tank for that purpose.

All branches or drops, should first point upwards, not down, and then by the use of a return elbow, come down to the spray booth. The return elbow prevents drainage into the branches. The slight amount of condensation which may occur in the branch from ceiling to booth, can readily be taken care of by the use of a small air filter at each outlet where the sprayer hose connects.

The use of a larger filter to be placed, in most cases, alongside the air receiving tank is also advised. Air is taken from the air receiver into this purifier and cleaned of all dirt, oil, oil vapor, and a large amount of its atmospheric vapor. The purified air then may be piped to the spray booths.

By following these instructions, everything possible as regards the air supply has been taken care of. There is no need of a refrigerating plant; experience has shown that while such a plant will do no harm, it is expensive and will not take care of the surrounding atmosphere.

Avoid Drafts

The surrounding atmosphere cannot be dehydrated, but users can do a great deal to help themselves if they will first prevent drafts by keeping all windows and doors closed. Secondly, see that the room is kept warm; if necessary, heat it.

The heated finishing room, in summertime, will not seem as hot to the operator as it would if it were not heated and all the windows open. Heating the room will dry the atmosphere which comes in contact with the finished surface, and assist to a large extent in preventing blushing.

Spraying air should be free from excess moisture.

Slow-drying Thinners

In addition to the above rules, a final precaution should be borne in mind at all times when the weather is excessively humid. Most manufacturers of lacquers and other finishing products,—particularly since the war,—have been using solvents and thinners much more volatile than theretofore. Users should have their lacquer manufacturer or supply house furnish them with slow-drying, though more expensive, thinners, to be used in humid weather only.

Close attention to these points

will assure all users maximum efficiency in remedying their greatest summer finishing problem. Begin planning now for next summer.

Spotting—Brown Specks

Another trouble which many have to contend with, where the finishes are either transparent or delicate in color, has been the spotting or brown specks which would show up. This has caused considerable trouble, and has frequently been blamed on potash, whereas it is nothing but oil from the compressor.

Oil will pass from the heated air compressor with the air, through the pipes and even though carried along in the form of vapor, at the point of discharge through the spray nozzle the expansion of air will create sufficient cold to condense this vapor into small particles. This causes the spotted effect on the work. The use of a suitable air filter will eliminate this trouble.

Keeping the Turntable Clean

To keep the spray-booth turntable clean, cover it with some kind of heavy paper that will stand a lot of wear. Some time ago I was in the varnish room of an automobile factory where the men were spreading varnish with brushes, and they had paper spread out to protect the floor from the drips. In reply to my inquiry one man said they changed the paper at the end of each week.

Later I stepped into a furniture factory and saw the turntable of a spray-booth covered with worn-out sandpaper which had been obtained from the machine room. It required several pieces of this old sandpaper to cover the table, but the paper gave the desired protection. However, considering the time required to go after the sandpaper and sort it out, the more economical way is to buy a roll of heavy paper especially for the purpose. Paper from the roll can be more easily and quickly put on the table than sandpaper, and the time saved is worth more than the material used.

If a turntable is already coated with varnish, or some other finishing material, it can be cleaned with caustic soda dissolved in water in the proportion of one-half pound of soda to a gallon of water. Pour the caustic soda in the water; then step back quickly to avoid getting splattered when the water begins to boil, as it will before the soda is all dissolved. When the mixture stops sputtering it should be stirred to complete the dissolution of the soda. For applying it, use a long-handle brush or a swab made by tying a rag on the end of a stick. Keep the hands away from it, for a drop of caustic soda solution will quickly eat into the skin. Handle the dry caustic soda carefully to prevent the dust flying in the air. If this dust from caustic soda settles on the skin, or enters the nostrils, it will cause severe irritation.

After the caustic soda solution has been applied, rinse the turntable with clear water, but keep the hands away from the turntable. Use a mop and wringer for the purpose.—Ralph P. Josylin.

There is a fine waterproof sandpaper on the market, that gives results which very closely rival a surface rubbed with pumice stone and water.

Lighting Fixture Lacquering

Decorative metal finishing, having been modernized by the introduction of new materials and equipment, is now capable of considerable variation to produce many beautiful effects

By R. L. Masterson

THE FINISHING of gas and electric light fixtures is one of the very oldest uses of nitrocellulose lacquers. It was in this industry that lacquers first gained wide popularity. The quick-drying, hard, durable, tarnish-resisting properties of lacquer made it ideally suited for this purpose.

Brass-Plated Metal

Most lighting fixtures today are made of brass-plated metal. Lacquer adheres well to brass and produces a very durable finish that will withstand considerable rough handling during shipment and installation. Furthermore, the finish is waterproof and is not easily harmed when the housewife washes her fixtures with a damp or soapy cloth. The beautiful, rich, velvet luster gives a very refined appearance to the finish.

Before starting to finish these fixtures, the metal must be absolutely clean and free from all grease, or other foreign materials. This holds true in finishing any metal surface with lacquer, but it is especially necessary where a smooth, even-luster, tenacious finish is wanted, as on fixtures.

Cleaning the Metal Surface

The usual cleaning procedure is to take the parts from the plating bath, run them through an acid cleaning bath (cyanide is frequently used), then into a hot water rinse and then dry them by tumbling in sawdust. The sawdust is then brushed off and the parts coated in a reasonable time, before they begin to tarnish. Care should be taken not to handle the parts with greasy hands after they have been cleaned.

Today, there are four main types of lacquer finishes on lighting fixtures. A great variety of effects can be produced with any of these types by a judicious choice of colors and by proper manipulation during application.

Clear Lacquer Finish

The natural or clear lacquer finish is the first type. The clear lacquer is reduced to the proper spraying or dipping consistency and applied over the clean, bare metal to give additional luster and to prevent tarnishing. Two types of clear lacquer are used—one to give the so-called brushed brass finish on brass plated work, and the other for use over nickel or silver plate work. The silver lacquer is especially pale in color.

Bronzed Lacquer Finish

The second type of lacquer finish is produced with various shades of bronze powders mixed with clear bronzing lacquer. For the more glossy, lighter tints, a pale gloss lacquer is used and it does not require a coat of clear lacquer over the bronze coat to give luster to the finish. For the darker and flatter finishes and antique effects, or where a coat

of clear lacquer is used over the bronze coat, an ordinary clear bronzing lacquer can be used.

Antique effects are produced by applying burnt umber in japan, or other japan colors, over the coat of bronze powder, after it is dry. The japan color is reduced to the proper consistency with naphtha and before it is dry the excess is wiped off, leaving high lights with the bronze powder showing through on the raised portion of the fixture and an antique or smudged effect in the depressed portions. By varying the shade of the bronze powders or the shade of the japan color an unlimited range of color effects can be produced.

The amount of bronze powder used varies according to the nature of the powder and the finish desired, but from 18 to 24 oz. of powder to the gallon of reduced lacquer, is the usual range. Only enough powders should be mixed at one time to take care of the immediate work in hand and they should not be allowed to stand over from one day to the next, because some of the powders change color and body up while standing.

Colored Lacquer Enamels

The third class of lacquer finishes is obtained with colored lacquer enamels. These are reduced in various proportions, ranging from five parts of lacquer and one part of reducer, to nine or ten parts of lacquer and one part of reducer, depending upon the shade of the enamel, the covering properties, and other qualities. If desired, these finishes may also be antiqued with japan colors reduced with naphtha.

The popular tones and hues of colored lacquer enamels are: gloss white, ivory, cocoa, taupe, pink, blue, green, maroon, flat black and gloss black.

Stippled Lacquer Finish

The fourth and newest type of lacquer finish is the so-called stipple finish which is produced by applying a coat of specially prepared stipple lacquer, sprayed full body through a special stipple gun which does not atomize the lacquer finely but puts it on with a rough stippled effect.

Low spraying pressures (around 30 lbs.) are used for applying stipple lacquer. When the stipple lacquer is dry it is followed with a coat of colored lacquer enamel or a coat of bronze powders in a bronzing lacquer. Antiquing can be done with japan colors which have been reduced with naphtha. The results in either case are very beautiful.

As mentioned previously, the clear or natural lacquer finishes can be applied by either spraying or dipping. The bronze powder solutions and the lacquer enamels are applied only by spraying. Usually only one application is given, the fixture part being slowly revolved while the lacquer is being applied. This is kept up until the proper film and covering is obtained by one application.

Drying the Finish

Practically all lighting fixture manufacturers make a practice of running the freshly-coated work through a heated tunnel on a conveyor chain. The temperature in the tunnel is usually maintained at 120 to 150 deg. F., and the chain is run at such a speed as to allow the parts to receive this temperature for a period of 8 or 10 minutes. This mild application of heat reduces the possibility of blushing and

enables the fixtures to be assembled or packed for shipment soon after they are delivered from the tunnel, thus saving considerable time.

Staining Gum to Match French and Huguenot Walnut

Many finishers have difficulty in matching gum wood with French gray and Huguenot walnut. Stain manufacturers are now giving special attention to this matter, and the finisher who is having trouble along this line should first consult the stain advertisers in this journal, for a solution of the problem.

There is one thing, however, that must not be lost sight of, and that is that no matter what stain is used one cannot make walnut out of gum wood, especially in so light a color. The most that can be reasonably hoped for is to match the general tone.

A great deal depends on the kind of gum wood, as to what effect will be produced and what the method of procedure should be. If the gum wood is red or black, and the walnut is bleached, the gum may be darker than the walnut. Thus the gum, too, must be bleached.

A good bleach can be made by dissolving ½-lb. of oxalic acid crystals in ½-gal. of hot water. Give the wood such repeated applications as are necessary to obtain the desired shade, and then wash off with clear water to remove all trace of the acid.

A 10-percent solution of hydrosulphite of soda is also a splendid bleach, and is often effective where the oxalic acid fails. It has one other advantage in that it does not have to be washed off afterward, though repeated applications may sometimes be necessary to produce the desired result.

After the gum wood has been reduced to the desired shade, stain it with a solution made by dissolving 1-oz. of walnut crystals in 3-qts. of water. This solution can be made lighter or darker by changing the proportions. Sometimes a very weak scarlet stain, applied prior to the walnut crystal stain, will help greatly in producing the correct shade; but it must be very weak —barely tinted.—I. F. B.

Polychrome Finishing

Polychroming is the artificial reproduction on wood of some of Nature's finest efforts. In early autumn, when the life-giving sap of trees is returning to the roots, Nature decks the trees and shrubs in lovely colors beautifully blended. No harsh or striking colors are in evidence—only subdued shades of almost every color.

In polychrome work we endeavor to obtain a somewhat similar effect—a blending of many colors. The methods of doing the work vary with different artists and finishers; each tries to attain the same end, though seldom are two pieces made to look exactly alike. Polychrome comes to us from the distant past. The carved and fluted columns which have been handed down through the ages, were frequently ornamented with paintings in various colors. As we view these columns today we do so as through a veil of mist. The storms of many centuries have subdued the brightness of the colors and hidden them behind the dust of the years.

Polychrome work can be done only on a surface that is fluted

and carved—never on a plain surface. The first operation is the application of a coat of liquid material to seal the pores of the wood. A coat of thin shellac or wood lacquer is usually suitable for this purpose. Next comes a coat of stippling material. After this coat has set sufficiently to be tacky and plastic the stippling may be done with a stiff brush, a coarse fiber brush being best.

The idea is to touch the stippling material gently with the end of the brush and in pulling the brush away, draw the material out into sharp points. In this condition the material is allowed to dry for about 24 hours. The condition of the material at this time will depend largely on how thick it was applied. The thicker the coating of stippling material the more pronounced will be the stippling after it becomes dry. If very thick it will draw out and dry in long sharp points. If moderately thin it will have the appearance of merely being pebbled.

Following the stippling operation the process will depend on the effect desired. Usually the surface is coated with a thin lacquer of any color desired. When this is dry the various shades of harmonizing colors are applied either with a spray or brush as occasion requires. The main thing is to have harmonizing colors and follow the lines of the article worked on, so that the design of the article and that of the colors will not conflict. To learn how to work this out it would be well to obtain a sample of high-grade polychrome work and study it very carefully so as to get the idea of design; then follow out your own idea of shades of colors.

After all the colors have been applied and are dry, mix a paste of pulverized rottenstone and turpentine, and apply a coat of this to the work. Wipe it off almost immediately with a soft cloth. The rottenstone is very fine and will find its way into every little indentation and pore, giving the work the appearance of being covered with a veil of dust such as centuries of time would produce.

The above is the real polychrome, but imitations sometimes are made without the stippling. The wood is stained and finished in the ordinary way and colors are applied in the same manner as in the real work. Sometimes this is done only on the bases of piano lamps and reading-lamp stands. Sometimes the posts of the lamps are carved and the carvings are colored in various shades while the wood between the carvings is left in walnut or mahogany color.

About all that can be done in the way of giving directions for this kind of work is to lay down certain fundamentals, and leave the finisher to work out the details for himself. It does not necessarily require an artist to do this but the workman must have some artistic ability.—T. K. Kenson.

Important Deal at Indianapolis

The entire business of the A. Burdsall Co., paint manufacturers in Indianapolis, Ind., since 1867, has been purchased by the Indianapolis Paint & Color Co. The combined annual business of the two concerns will reach nearly $2,000,000.

The new owners will continue the Burdsall plant and organization as a separate establishment, and the trade marks and brands will remain as before. Marion E. Ensley, president of the Burdsall Co., will retire and Chas. M. Malott, president of the Indianapolis Paint & Color Co., will succeed him. S. L. Bassett, general manager; F. A. Guth and C. B. Henkle will retain their offices under the new ownership.

Getting True High-Light Effects

Foreman Finisher of chair factory explains some of the requirements of true high-lighting and tells how to obtain them with modern materials and equipment

By Geo. S. Paine

HIGH-LIGHTING and two-toning seem to have met with a widespread popularity that is ever on the ascendency. To produce the desired effects in the most economical way has called forth the ingenuity of every furniture factory finisher.

There are numerous ways of obtaining the high-light effect and a myriad of materials that can be used for the purpose. Probably each material and process has some advantage over others that adapts it to different requirements. Where an article is to be dipped in water stain, several methods may be practiced.

Depends Upon Ground Color

If the ground color is light and the high-light effect has to be brought out by shading about the surfaces, it is well to stain first and then, with a stronger solution of the same stain or with a black added to it to deepen the tone, put in the shading with an air brush. Or, if an oil pigment, glazing stain, spirit stain, colored shellac or a colored lacquer is to be employed for shading, the surfaces should be filled before applying the shadows.

If the general tone of the finish is dark and the high-light is to be obtained by making the surfaces lighter in places, the work may be done in other ways. When water stain is used a sponge, or cloth wet in clear water, may be used to wash the stain from the high-light portions, or these places may be sanded off when dry with fine sandpaper or steel wool.

Stains and Fillers Important

In case of an oil stain, a benzined cloth will lighten the stain at the required points, but there is danger of the filler undoing the work. A filler carrying a heavy load of color would, in any case, greatly modify any high-lighting put in before filling, so that in the preliminary work it would be necessary to greatly exaggerate the effect desired on the final finish.

If a water stain were to be used over the filler for shading, a little alcohol will aid the penetration, but such a practice could not be recommended. If a different tint should be desired in the high-light, it might be brushed on and wiped to the desired shade, the material used deciding just where, in the process, this work should be done.

A Striking Effect

A case to point is a Tudor Chair of birch; the high-light looked so raw against the shade of mahogany chosen for it that we tinted the high-lighted sections with a weak solution of brilliant-red water stain, after the high-light had been sanded in. If a chair finished this way were to be placed before a fireplace, it would have the appearance of reflecting the flames—a beautiful and striking effect indeed.

One caution I would add to all

high-lighting operations — they should blend into the basic color of the chair. A shadow that isn't thinned out to the edges gives the appearance of a blotch that spoils entirely the artistic intentions desired of the finish.

With the Air Brush

In high-lighting with an air brush, the operator should shorten each sweep of the gun so that the depth of color at the corners gradually thins out and

A chair high-lighted.

allows the under color to more and more influence the general effect.

The high-light was probably inspired in duplicating old original pieces that had acquired an "honest to goodness," true high light effect through years of service. In modern finishes it often taxes one's imagination to conceive how wear could possibly come in some places where we find it necessary or desirable to show high-light effects, but it has emphasized many beautiful features in design of some pieces of furniture—features that would have otherwise been overlooked and so we have to put it where it shows to best advantage.

Coloring Fillers

The colors mostly used for coloring filler are, burnt umber, Vandyke brown, sienna, rose pink and drop black. Some finishers buy their fillers ready colored; others buy a white filler and color it themselves to suit their various finishes. Some finishers who color their filler, themselves, do so with dry colors; others use colors ground in oil; still others use colors ground in japan.

On several occasions I have been asked which is preferable, and which is the most economical way to use colors for coloring filler. I have made fillers for a great many years, and have used these colors in all three ways. I do not hesitate to condemn the use of dry colors as being wasteful and inefficient.

To get results from dry colors one must use almost an equal quantity of color and silex, which, of itself is sufficient to condemn it, because no coloring matter makes as good a filler as does silex. In the next place dry colors are more expensive than silex, and this increases the cost of the filler.

The reason why a large quantity of dry coloring matter is required to color filler is on account of it not being finely ground. The finer a color is ground the more effective it is as a coloring for another pigment.

Coming to the colors ground in oil and japan, here is less room for making a choice than there is

between either of them and dry colors. They are both finely ground, though as a rule japan colors are superfine and therefore more effective.

Filler should not be colored with drop black alone, unless a gray filler is desired for some special work. The white silex and the black make a gray. Drop black should be used only where one desires to darken one of the other colors. A moderate amount of Vandyke brown or umber will make a brown filler, the shade of which can be varied by varying the amount of color used.

If a real dark filler is desired a small amount of drop black may be added to either of the above-named colors until a black filler is produced, or one that will have a black appearance in the pores.—C. L. Young.

Baking Oven News

In producing the protective and ornamental finish to articles of wood, metal, etc., the baking oven plays a most important part. An article treated with the best japans or enamels will have the finish ruined by improper oven baking. Well finished products, while not always more efficient than those poorly finished, certainly are more pleasing to the eye and tend to create a greater volume of sales.

Realizing the importance of heat treatment necessary to proper industrial finishing, Skinner Brothers Mfg. Co., Inc., with factories located at St. Louis, Mo., and Elizabeth, N. J., have developed, after a year's experimental work, their "revolving door oven". This unit is being produced at Elizabeth, N. J., in three standard sizes.

Materials to be dried or baked are placed on, or suspended from, grids that fit into racks on both sides of a revolving door. These racks are adjustable and can be spaced at 4-in. intervals, depending on the size of the articles being treated.

A half turn of the revolving door places a charge within the oven and at the same time removes a finished bake. This is done very quickly and with a minimum temperature drop in the oven.

Revolving the door changes position of racks so that a new charge is admitted to oven when another is withdrawn.

Heat is applied by the indirect method, with either gas, electricity, oil, or steam as the heating medium. Articles being baked are not exposed to the products of combustion. This method permits the baking of light color paints or enamels, as well as the darker japans.

The oven is constructed of sheet metal panels encasing heavy layers of a heat-resisting insulation. All edges are re-enforced with steel angles. The corners are held together by patented corner plates. Asbestos heat breakers are inserted at all points

where heat losses might occur through means of direct conduction.

The door is of rigid construction, heavily insulated, and pivoted in ball bearings. It is sealed to the oven front by means of angular corner members and double flexible and adjustable wipers along the top and bottom edges. It is locked by four swinging latches attached to the corner members, which engage with wedges attached to the door. The binding action of these latches draws the corner members against the door front. The entire mechanical apparatus in connection with the door operating mechanism is very simple and will not get out of order.

Ample provisions are made for balancing the oven chamber and taking care of light and heavy fumes given off during the baking process of japans and enamels. Part of the fumes are drawn off from the bottom and part from the top of the baking chamber, through flues controlled by one damper.

Fresh air for circulation is drawn through pipes passing through the combustion chamber where it is preheated before entering the baking chamber. This air can be arranged to be taken from the outside atmosphere, or from the room and drawn through a filter, when desired.

Each oven is manually or automatically controlled as desired, and will maintain uniform controlable temperatures up to from 500 to 550-degs. Each oven is supplied with positive and uniform circulation by means of a small exhauster located on the top of the oven.

Lacquer Solvents

New solvents are coming into the industry all the time. It is hard to predict what some of these solvents may accomplish. Some are being imported from Germany, some are being developed by the oil companies on this side, and the balances of solvents are being changed.

We find that changing solvents and the particular composition of our so-called thinner material makes a vast difference in the application of the lacquer, its flowing qualities, its lustre and many other qualities.

According to figures compiled by the Industrial Division of the U. S. Bureau of the Census, the automotive industry consumed in the 12 months ending June 30, 1925, 12,700,000 gallons of paint and varnish—an average of more than 1,000,000 gallons per month.

Gilbert Spruance Co. Open New Lacquer Plant

The Gilbert Spruance Co. for 15 years specialists in the manufacture of quality stains, fillers and other wood finishing materials used by the furniture industry, is now adding a lacquer plant to their factory in Philadelphia. This lacquer plant, like the other manufacturing facilities of the company, will be completely equipped to turn out high-grade, dependable products, utilizing the most modern manufacturing processes.

For several years the company's laboratory staff has been conducting a thorough research into the manufacture and use of wood lacquers. The results of this work are now about to be placed at the disposal of the furniture trade through a new line of clear lacquers, which are expected to be ready to market on November 1st.

The work of manufacturing these products is in charge of a skilled lacquer chemist—a man who has had exceptional training and experience, both in the production and application of wood lacquers. The production will at all times be under that scientific laboratory control by which The Gilbert Spruance Co. maintains uniform standards of quality.

Paint Shop Auto Finishing

Technical Director of large concern calls attention to problems involved in automobile refinishing shops and explains certain features of varnish, lacquer and oil-enamel finishing systems

By Wayne R. Fuller

THE past two years have witnessed a revolution in the finishing methods employed by automobile manufacturers. Where everything was varnish and high-bake black enamel, today varnish has given first place to lacquer enamel, and low-bake colored enamels are being used on no small scale. To inquire the reason for this change would be beside the purpose of this article; enough that it is with us and is likely to be permanent.

New Finishes—New Problems

Obviously, a change so radical as the use of lacquer enamel, heralded by extensive national advertising, must create a demand for the same kind of finish on used cars. The ordinary paint shop lacked the special equipment required to handle lacquer and was no less handicapped through having no experience with it, consequently it was unable to satisfactorily meet this unexpected situation.

To some of the more venturesome paint shop owners, lacquer represented an opportunity to get in on the ground floor with a good proposition and they hastened to equip for lacquer work by installing the necessary spray outfit, exhaust system, etc. Then their troubles began. Some gave it up as a bad job, but the majority doubtless have persevered and, with increasing experience and knowledge, are able to turn out acceptable jobs on a profitable basis.

Most of the shops using lacquer are finding their costs higher than was anticipated and this tends to keep them wondering whether they have found the ultimate finish. On the other hand, most of the shops that continued with varnish exclusively are finding that much of their old trade is drifting away from them because the car owners want a more durable finish and do not want to lay their cars up longer than a week. Within the past year the situation has been further complicated by the advent of a line of oil enamels that are refined to a point where they meet the exacting requirements of the professional finisher.

It should be recognized at the outset that it is not a question of what is the one best finishing system, as the answer will depend on the price of the car, the care it receives, the owner's preference and other circumstances.

We can safely assume that the three major systems mentioned will all be used more or less for years to come. The real problem is to determine the advantages and limitations of each and thus to arrive at its proper place and importance. It should then be possible for each shop owner to decide what system or combination of systems will best meet his particular needs.

Varnish Finishes

There is no occasion to tell a finisher either the good features or bad features of a varnish fin-

ish. He knows only too well what a long, tedious process it is to turn out a varnish job, how difficult it is to make a fair profit on such work and how often there is a "come back" on lack of durability. On the other hand, the finisher appreciates fully the surpassing beauty of a good varnish job. He is mindful, also, of the fact that varnish work can be done without special equipment.

But no matter what the finisher might like to use, the majority of car owners are going to insist upon a finish that gives longer service than the most durable finishing varnish made. It can, therefore, be expected that varnish will be used on a much smaller scale, its main application being on high-priced cars, owned by people who want the most beautiful finish obtainable regardless of cost. This means that unless a shop plans to specialize on a restricted class of trade it should not place its main reliance in varnish work.

Lacquer Enamels

It is more difficult to discuss lacquer enamels, because they are in such a comparatively early stage that important improvements are bound to occur.

A study of the finishing systems recommended by the different lacquer manufacturers will show considerable variance, but it is reasonable to suppose that as time goes on they will come more nearly together. Even now some of the trends are quite plain. For instance, it is clear that all coats, with the possible exception of the primer, will be made on a lacquer base; also, that the finishing enamel will be a product having at least a fair degree of gloss.

In view of the inevitable improvements in lacquer enamel, our appraisal of it must take into account future probabilities as well as the present situation.

From the standpoint of the custom shop, lacquer enamel has two big advantages—speed and durability. Under shop conditions it is seldom practical to turn out a lacquer job in the time claimed by the lacquer manufacturer, the actual time running from a few days to ten days, according to the nature of the undercoats used and the efficiency of the shop.

In fairness to lacquer, it must be said that there is no necessity for the longer time mentioned, and one-half to a third the period required for a varnish job should suffice for lacquer. Automobile manufacturers, with their special equipment, carefully worked out processes, and specialization of workers, are able to obtain the maximum speed from lacquer enamel.

While the custom shop cannot hope to compete with the factory, it can approach factory efficiency in proportion to the volume of work it handles and the extent to which it adopts factory production methods. For this reason the manufacturers' agencies and large paint shops have better success with lacquer than do the smaller shops, which are not in a position to utilize the most efficient and thorough methods of removing the old finish, cleaning

off oil and grease, polishing, etc.

It has been abundantly demonstrated that good lacquer enamels are highly durable, meeting every reasonable expectation.

These excellent features are obtained, of course, at the expense of an initial investment in spraying equipment. In addition to the spray gun with attachments, it is necessary to install an air compressor (unless air happens to be available) and an exhaust fan.

Next comes the problem of spray operators. Usually experienced sprayers are not available and green men must be broken in. Then there is the possibility of grief with jobs that go wrong, particularly while the men are gaining experience. The cost of the materials for a lacquer job runs higher than for varnish, and the total cost of the lacquer job is usually as high or higher.

On account of the extensive use of lacquer enamel on new cars and the publicity given it, there exists an unmistakable demand for lacquer for refinishing. This, coupled with its speed of application and durability, seems to indicate the increasing use of lacquer enamel by the custom shops. However, many of the large shops will continue to have considerable call for varnish or oil-base materials and, if they adopt lacquer, the conservative plan would be to handle it as an adjunct to the other finishes.

AUTO LACQUERS

Contains no gum whatsoever.

We have made lacquers for all finishes since 1857

Chas. Cooper & Co.

90 Worth St., New York
Works—Newark, N. J.

Air-Drying Oil-Enamel

The third type of material—air-drying oil-enamel—is new only in its application to the highest grade automobile work. For years oil enamels have been advertised and sold to the amateur for finishing his own car. Oil enamels of a longer and more durable type have been used by the railroads for finishing coaches, largely because of their remarkable durability.

Long oil white enamels have long been a standard finish for high-grade architectural work, exterior as well as interior. It seems only natural that the same general type of product should be adaptable to the requirements of auto paint shops, but it remained for the shops to discover what a useful material oil enamels could be to them.

Several years ago a number of auto paint shops found that a certain type of black oil-enamel gave a splendid finish on fenders and hoods and on upper decks of closed jobs. Then came demands for a similar enamel in colors. The manufacturer, therefore, undertook to develop a line of colored enamels that would correspond in quality with the black and white, and conform to the exacting requirements of the professional automobile painter. After much painstaking work this was accomplished and, when the line was put on the market about a year ago, its enthusiastic reception showed that it satisfied a real need.

The System in Detail

One manufacturer's oil-enamel system for automobiles consists of one coat of primer-sealer and two coats of enamel, with the use of glazing putty and surfacer optional and depending upon the condition of the metal. This sys-

tem is simple, requiring only two materials for an ordinary job, and these can be applied either by brushing or spraying.

It is quick; a complete job can be turned out in six to eight days. It is satisfactory as to both appearance and durability. The oil-enamel dries with full body and such a high gloss that at times it is taken for a varnish finish. The first cars finished with this system are still in good condition after about two years of service, and it is conservative to say that the durability compares favorably with lacquer enamel.

The primer-sealer for this oil-enamel finish for automobiles is furnished in two colors only—light (gray) and dark (red). The oil-enamel is made in 18 colors, including black and white. Practically any shade can be secured by mixing two or more colors.

The schedule recommended for bringing up a job from the bare metal is as follows:

One coat primer-sealer of proper shade. Allow to dry over night. Sand lightly.

Two coats oil enamel, selected color. Allow first coat to dry 48 hours, and lightly wet sand with waterproof sandpaper and water. Do not expect this oil enamel to harden like a color varnish, as it is not designed for rubbing.

Note (a) When necessary, spot putty over the primer-sealer, using a putty of about the same color as the enamel.

Note (b) While surfacer is not required for many jobs, it may be used when the metal is rough or an especially smooth finish is desired.

Note (c) A small amount of suitable rubbing varnish may be mixed with the first coat of enamel, if the painter wishes to hasten the hardening.

The experience of a large number of custom shops with this oil-enamel system has brought out a number of features that make it peculiarly adapted to their practical requirements.

Water Shellac

Gum shellac dissolved in strong ammonia water dries more slowly than alcohol shellac, as is to be expected, since water evaporates more slowly than alcohol. When it is dry it rubs out as well as the alcohol solution, and it also sands as well. For wood finishing it gives a satisfactory coating under varnish. As it does not set quickly it admits of brushing out smooth, and it will not need much rubbing.—W. E. S.

Metal Trim in Lacquer

In finishing the metal trim of its new general office building at San Francisco the Pacific Telephone & Telegraph Co. has employed lacquer in place of enamel. The lacquer has a softer luster than the ordinary enamel finish, and if experience in its use on automobiles and elsewhere is borne out it should prove more durable.

Likewise there are several advantages in the application of it as compared to enamel. Unlike baked enamel it can be put on after the trim is up. Compared to other finishes, which do not require baking, there is an advantage in the quickness with which it dries. Successive coats may be put on only 20 minutes or half an hour apart.

Probably the greatest drawback to the use of lacquer is its expensiveness. At the present time it is more costly than any form of enamel finish. It remains to be seen whether its greater durability and better appearance will compensate for this.—G. H. Preddy, in charge of office planning, Pacific Telephone & Telegraph Co.

Decorating Ornamental Screens

Some essential and interesting features to consider with regard to the design and ornamentation of high-grade artistic screens for rooms of refinement

By Von Lindau

SCREENS are as old as civilization and are a compliment to most any room. The manufacturing and decorating of screens is an art all by itself. It is as manifold as we have shades for decorating rooms.

By studying this art we found a wonderful display of screens, and this industry looks very encouraging. Of all the screens to be seen, a good many are top-heavy. How about a wavy design wider on the bottom than on the top? Especially canvas-covered screens where the sides and the top run out to a V-shaped edge.

The decorating of screens is an art worth while studying. The screen should match the interior decorating, the furniture, the wall and the rug. For instance, if the furniture is green naturally the rug will be green. Now it is necessary to start our screen with a green and run out to the top by blending to an almost air-like nothing color. The appearance will stay green; the effect is surprising, as it appears that the screen actually occupies not half the space it in reality does.

Just like a well-set theatre scenery where the wings are melting into the background, so should our screen melt into the rug, furniture, wall and ceiling. Then it will not be what in reality it is—an article to conceal something—but a room decorating ornament.

If a flower design is used start at the left or right (whichever suits you best), about 8 or 10-in. from the bottom, and run your flowers higher and higher to the center till about two-thirds of the entire height is reached. As you come up with your design from one side, so you should come down to the other. The design is entirely subject to the artist—a delicate and graceful design well in proportion to height and width.

The design should be kept complete within each section—never run through the joint where the hinges are fastened. Softly-tinted colors shall harmonize with the background. The flowers should not crowd higher up but run out in stems, buds, and small leaves.

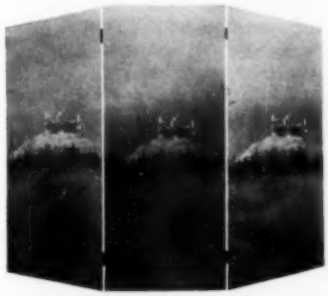
If landscape designs are used (which is about the latest in design) the pictures must fade away in the distance and into the background unnoticeable. Such a decorated screen never will appear top-heavy; it will be an ornament to the room and a credit to the manufacturer.

A heavy style of furniture, Renaissance for instance, surely will require a heavy style of screen with wood carving on the sides and top. The panel, whether painted or tapestry, shall match the draperies and portieres. If any hand decorating is done, do not use any gold; keep your decorating the same shade as the frame is finished.

Rocogo style is always kept in light colors, such as light green, light blue and even white, etc.

The decorating should be accordingly, and plenty of gold is required.

Once I had the opportunity to look at a remarkable screen. The friendly owner of a very old Patericier House in Venice showed me through his wonderful ideal of an old mansion. The draperies, the furniture and the decorating was overwhelmingly grand. In one room, undoubtedly once the room of the mistress, I saw this remarkable screen. A rosebush in such rich natural colors as nature only can produce and still it was not loud, as it harmonized with the entire surroundings. The screen was made out of light but durable wood about ⅜ or ½-in. thick and it was cut to the design of the rose bush. Only on the top, where the flowers and leaves are not so thick, were a few openings, or better said the flowers were cut out.



A screen with artistic and balanced.

As mentioned before, the manufacturing and decorating of screens needs a careful studying of furniture architecture and interior decorating. So we keep on working and studying and cooperating with the neighboring trade. Only the best is good enough for our customers all over the world.

About Water Staining

Objection to the use of water stain in that it raises the grain, especially on medium-class industrial millwork or building trim, can be sustained, as this class of work is seldom belt sanded or hand sanded.

In fact, drum-sanding is about as near as a great deal of millwork comes to being prepared for smoothness, but for general first-class cabinet and furniture work water stain has proven to be especially satisfactory, as it is permanent to a high degree, whereas some oil and spirit stains are not fast to light, and only give a superficial coating to the wood.

In preparing wood surfaces for water staining, it is important to sponge coat the wood first with warm water to which a little glue has been added. This does not mean glue sizing by any means, but to a gallon of warm water add two ounces of glue, which is sufficient.

This will not glaze the surface nor interfere with the staining. This adding of glue to the sponge coat is an essential feature and should not be omitted, as it leaves the loose fibres or grain in a stiffened position to be sanded off, and not to be ironed down by the hand sanding block, only to be brought up again in the water stain coat.

This sponge coat should be given a light and careful sanding with fine paper, being careful not to sand through. It should be sanded just enough to give the surface a smooth feeling of smoothness. The surface now should be dusted and stained after which it be given a coat of shellac size. After sanding this size coat, the surface is ready to be filled, etc.—Edw. C. H. Rottmann.

Ovens For Baked Finishes

Excerpts from article in "Automotive Industries," in which writer points out requirements of cleanliness, methods of heating, systems of ventilation and principles of forced drying in modern finish drying ovens

By P. M. Heldt

DRYING and baking ovens have become an important item of equipment in automotive manufacturing plants, and great advances in the design and equipment of these ovens have been made in recent years. Ovens as used in the automotive industry may be divided into three general classes:

1. The kiln or cabinet type, in which the work is placed in the oven directly by hand or on trucks which are wheeled into it.

2. Intermittent or semi-continuous type, with which the work is loaded onto a mechanical conveyor which is moved forward at intervals as one batch has been baked and another is ready to enter the oven.

3. The continuous conveyor oven, in the case of which a mechanical conveyor moves through the oven continuously, the work being placed on the conveyor as it enters, and removed therefrom as it leaves the oven. This latter type of oven is usually combined with a dipping and dripping compartment, or forms a continuation of the department in which the protecting coats are applied by spraying or flowing.

A very important consideration in the design of drying ovens is heat economy or heat conservation. In order to prevent loss of heat through the walls of ovens, they are now always made of some heat-insulating composition, such as magnesia or asbestos block, the thickness of the walls being increased with the temperature at which the oven is to operate.

Heat Storage in Walls

Oven walls should have a minimum heat storing capacity. This is particularly important in the case of ovens which are loaded and unloaded at intervals, which drop greatly in temperature during the loading and unloading period.

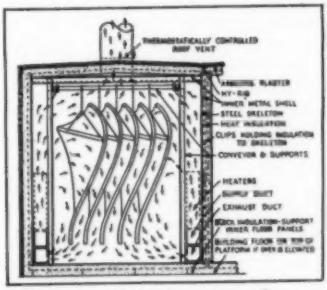
If the material of the walls had a high specific heat, obviously a great deal of heat would be required to bring them to the operating temperature each time, and this heat would be entirely wasted. This means that in the case of the insulating materials, not only their resistance to heat flow, but also their specific heat must be considered. Furthermore it is an advantage to use an inner metal case of comparatively light gage, as the exposed metal naturally gives up its heat readily and cools rapidly.

Another requirement is that the joints be air-tight and remain so in use. This is important not only because any leakage of the hot air through the joints of the roof, for instance, would reduce the efficiency of the oven from the thermal standpoint, but because, as a result of the system of air circulation usually maintained, dust-laden air would be drawn in through some of these

cracks and the dust would spoil the finish.

Heating Systems

In drying coats of varnish only comparatively low temperatures are permissible, of the order of 120 to 150-deg. F., and with ovens for this purpose the heat is generally supplied by steam coils or radiators. This applies also to coatings of pyroxylin-base lacquer, which are generally allowed to air-dry, while in some cases, particularly in the finishing of bodies for low-priced cars, they are dried in ovens maintained at a mild temperature.



Showing ventilation in one type of oven.

For baking ovens, it is impossible to get a sufficiently high temperature from steam; some other kind of heat supply must then be used. For core baking ovens it has been the general practice to use either coal or coke as fuel, but for drying coats of paint, varnish or japan, the use of liquid or gaseous fuel, or of electric heat, has been found preferable.

With liquid or gaseous fuel two different methods of heating are available, the direct and the indirect systems. With the direct system the gases of combustion are admitted into the drying chamber, and this system has the advantage from the standpoint of thermal efficiency, as well as from that of low first cost.

The greater economy, however, is offset by the fact that the atmosphere within the drying chamber will contain particles of soot which are apt to impair the quality of the finish obtained, and that the fire and explosion hazard is increased, because flame is always present. If for any reason the content of vapors of the solvent should become sufficiently great to form an ignitable mixture, all the elements necessary for an explosion would be present.

Usually, however, if an ignitable mixture forms anywhere in the oven it is fired almost immediately, and the result is merely a flash-up instead of a serious explosion. It is probably chiefly on account of the lesser degree of cleanliness that the direct heating system is used only where the highest quality of work is not required and where very quick drying is not necessary.

Electric Heating

In the majority of paint-drying and japanning ovens now used in the automotive industries, either the indirect oil or gas or the electric heating system is used. With the electric heating system, heating units are secured to the walls of the ovens in such positions as to assure the best possible temperature distribution.

The electrical system is ideal from the standpoint of heat control and has a number of other advantages. Naturally, however, electrical heat is rather expensive, even when electrical energy is supplied for as low as 2c per K.W. hour. Another objection that has been raised against the electric system is that the ribbon of the heating units is rather

frail and becomes easily broken through carelessness of the operatives during the weekly cleaning of the ovens.

The heaters employed with the direct system of heating by liquid or gaseous fuel work on a principle similar to that of a steam boiler. The air is forced through coils of pipe located inside the burner housing, absorbs heat from the flame and hot gases, and is then carried through an air duct into the oven. This duct usually extends lengthwise through a considerable part of the oven and has a number of damper-controlled outlets, by means of which one can regulate the distribution of temperature and also, to a certain extent, the circulation within the oven.

Ventilation of Oven

Ventilation of drying ovens is required chiefly for two reasons. If no ventilation were provided the vapors from the solvents of the protective coating would accumulate and eventually would form with the air an explosive mixture, which would involve considerable danger. Another reason for renewing the atmosphere in the oven is that the oxygen of the air is consumed in oxidizing the vegetable oils of the paint or japan, and if the air should become appreciably poorer in oxygen, the oxidizing action would undoubtedly be retarded. For these reasons the air in the oven is changed from 15 to 30 times per hour.

Circulation induced by a ventilating system, moreover, helps with the equalization or regulation of temperature throughout the oven—a highly important feature. On the other hand, allowing air to escape from the oven at a temperature of say 150-degs. F. or more, at the rate implied by 15 to 30 complete renewals per hour, is a serious source of loss, and one company, at least, re-circulates the air.

The blower of the ventilation system is arranged with a double inlet admitting fresh air and air from the vent of the oven, respectively, both inlets being provided with dampers so as to make it possible to vary the proportion of fresh to re-circulated air. This would seem to indicate that conditions of temperature equalization call for a more rapid circulation of the air than the devitalization of the air by the oxidation process and the danger of forming an explosive mixture by the admixture of the vaporized solvents with the air.

The Drying Process

The drying of coats of paint, varnish and japan is a somewhat involved process and cannot be directly compared with the drying of water-wet articles. Of course, all of these finishing materials contain a solvent which is driven off by evaporation during the drying process. In addition, however, paints contain a great deal and japans a smaller amount of linseed oil which is not evaporated but oxidized.

At first thought it might be supposed that absolutely dry air would cause a coat of paint or varnish to dry most rapidly, but freedom from moisture does not even expedite the evaporation of the solvent, owing to the operation of the law of partial pressures. According to this the rate of evaporation of any fluid depends solely upon its vapor tension and upon the partial pressure of its vapors in the surrounding atmosphere; it is entirely independent of the content

of other vapors in the atmosphere.

The process of oxidation of linseed and other oils is greatly accelerated by the presence of moisture in the air, and it is therefore common practice in paint-drying installations to humidify the air entering the drying ovens.

Moisture in Air

The amount of moisture which air will hold without becoming foggy varies with the temperature. If the air contains the full amount of moisture it will hold at any particular temperature, the humidity is said to be 100 percent, and if the moisture content is less it is expressed in percentage terms.

Different finishing coats require different degrees of humidity for their most effective drying. This has to be determined experimentally, and the humidifiers used in connection with the drying system are then regulated so as to provide this degree of humidity.

Another requirement is that the air entering the oven be practically free from dust particles, as these would settle on the coated surfaces and form specks. Therefore, before the air is admitted to the drying oven it is passed through an air washer.

Bleeding of Colors

Bleeding stains and coloring matter are sometimes wrongly treated with shellac. The alcoholic solvents in shellac are very powerful in dissolving bleeding colors. Sizing materials containing mordants and chemicals which act to set such coloring matter are preferable.

Where subsequent coatings of paints and enamels are to be applied the most secure method of preventing bleeding of colors is to apply a coat of black in japan, thinned down with turps to proper consistency, after which any white or other coating may be applied.

As red is mostly encountered by painters in giving trouble, it is to be assumed that the red, taken up by the black turns into brown; brown has never been known to give trouble by bleeding. Furthermore, white applied over black will give a better non-yellowing finish than if used over any other coloring matter. The light rays thrown back by black through the white will make it look whiter.—Geo. Whigelt.

Chinese Glue

What is known as "Chinese glue," is simply gum shellac dissolved in strong ammonia instead of alcohol. It may be thinned with benzine. There is, or was, on the market a preparation that seems to be this form of glue. It is claimed for it that it will not raise the grain of wood, that it sets slowly, dries hard quickly enough, flows out well under the brush, does not show brush marks, dries flat, requires no sanding, and so on. It is advised not to use it on floors nor for hiding pine knots, as it will not do these things. It should be useful for many purposes where shellac varnish is used.—L. J. M.

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PRACTICAL PUBLICATIONS, Inc.
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Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

NOVEMBER, 1925

More Than Skin Deep

The final finish is simply a reflection of the surface underneath. A really durable, smooth and attractive finish, either on a wood or metal surface, is the result of much labor and skill plus the intelligent use of balanced materials of dependable qualities.

On both wood and metals the preparation of surfaces for the staining or priming and undercoats is of the greatest importance, for if undercoats are not securely anchored to the clean bare wood or metal, the anchorage of the final coats will not be secure and as a result one may expect scaling, chipping, etc. Every succeeding coat must attach itself securely to the one that has gone before.

Smoothing the surface with suitable materials and according to economical methods must begin with the preparation of the surface for the first application, and continue between applications throughout the process. Cleanliness must prevail everywhere and especially as applied to the surfaces being finished, the materials used and the containers, brushes, spray guns, spraying air, drying compartment, and finally the rubbing and polishing accessories.

The success of finish coatings are dependent to some extent upon the temperature and relative humidity of the air being suitable for such work at the time the coatings are applied.

Every step in the finishing process is so important, and there are so many steps necessary even with the latest materials and equipment, that when we stop to think of it we are more and more impressed with the fact that a finish worthy of the name is indeed more than skin deep.

Strive For More Knowledge

Divers are the means whereby finishing room foremen can augment their present knowledge. Every department head naturally finds it to his interest and profit to acquire still further knowledge, however well up on technical lore he may be. If he does not seek he will not find. If he does not add to his information all the time, he is not making any further progress; instead, he stands still. Hence the importance of ever striving for additional knowledge, and then to use it.

Foresighted and ambitious finishing room foremen who do this regularly are beset with fewer finishing room troubles; they can meet and solve more of them; they can get out their work better, more quickly, and more of it —in a word, they are greater assets to their plants.

Future Auto Finishes

Speaking of the "Trend in Body Styles" in an address delivered at the Fifth Annual Convention of the Automobile Body Builders'

Association this year, at Detroit, Mr. H. C. Wendt, body engineer of the Moon Motor Car Co., St. Louis, made these significant remarks on the subject of automobile finishing:

"I would see that an attractive two or three-tone paint job was worked up with striking but judiciously applied striping employed. I would use one of the many excellent pyroxylin finishes on the market as this type of finish has gone over the top with the greatest of success.

"For the next year, however, I would adhere to as bright a lustre on this finish as is possible to obtain with rubbing and wax. The only sales resistance encountered when this finish was first produced was the absence of the high lustre of a varnish product. The public is gradually becoming accustomed to this and I believe that in the next few years we will be able to reduce the lustre on our pyroxylin finishes."

More Competition—More Color Finishes

Today one doesn't need to look far to see that competition among progressive concerns in industrial and commercial lines has had the effect of stimulating greater use of color finishes—stains, shellacs, paints, varnishes, enamels, lacquers, etc. On more and more articles made of wood and metal, coatings are being applied not only for protective purposes but also for decorative effect.

This brightening up with color emphasizes the newness of things and makes them stand forth in striking contrast to whatever presents a surface of faded, tarnished or worn appearance. As a result more attention is being directed toward the use of protective and decorative coatings for maintenance and renewal service—to keep the old looking new. Repainting and refinishing are being done more often and on a more extensive scale than ever before. More people are sold on the idea of beauty and permanence in finishes.

Where there is beauty of finish there is a compelling attraction—a human appeal. Realizing this fact the Chicago Surface Lines have revised their overhauling program so that everyone of the 3,500 cars on the system is repainted, revarnished and thoroughly cleaned inside and out every two years instead of every four years, as had heretofore been done on this property. This has been found to have a very definite relation to the excellent record made by the Chicago Surface Lines in holding passenger traffic for 1925 above all previous years, in spite of motor bus competition.

Modern Brushes

Painters, finishers and decorators are still using brushes to a certain extent, and expect to use them for a long time to come. Some improvements are noticeable in brushes in the setting of same, as vulcanized or rubberset brushes are mostly used now. The qualities of bristles are reduced and black Chinese bristles are more common than the former high quality of Russian bristles.

It is interesting to know that today only a small percentage of surfaces are covered with the aid of bristles against the quantity of surfaces covered with the present method of machine spraying.

Dull Rubbing and Polishing

Chief Finisher Foreman of Tennessee Furniture Corporation explains how to prepare surfaces, and tells what materials and equipment to use for dull rubbing and polishing modern varnish and lacquer finishes

By Cliff Stanton

GOOD TASTE in finishing demands that the natural gloss of the varnish be dulled. This dulling process not only eliminates the objectionable gloss from the varnish, but it also brings out the natural beauty of the wood by giving to the finish a depth that can not be obtained in any other way.

The two finishes most frequently met today are varnish and lacquer. The chief difference in rubbing the two is the degree of hardness of the two materials.

Preparing Surface

Varnish should stand from six to eight days, depending upon the atmosphere, before it can be rubbed with safety. The experienced rubber always tests a varnished surface before he starts rubbing it. He uses the finger nail test which is nothing more than trying to dent the surface of the varnish with his finger nails. If he can dent the varnish he knows that it is too green to rub. If not, it is ready to be rubbed.

Lacquer dries in a few hours and may be rubbed with safety 24 hours after it has been applied.

To prepare the surface for rubbing the process is as follows: First, completely cover the surface to be rubbed with paraffin oil to which has been added plain kerosene in the proportion of one pint of kerosene to one gallon of paraffin oil. This slight amount of kerosene adds greatly to the flowing of the paraffin oil.

After the surface has been completely covered with oil it should be generously dusted with No. FFF pumice stone. The surface is then ready to be rubbed.

Machine Rubbing

To get this operation done economically it is necessary to employ both machine and hand operations. All flat clear surfaces can best be done by either the pneumatic or the electric rubbing machines. These machines carry two felt pads, each about 4½ in. square. These pads oscillate rapidly and as the machine is moved back and forth across the surface the felt pads rub the varnish to a true surface.

In all rubbing of flat surfaces it must be remembered to have the felt pads follow the direction of the grain of the wood.

Hand Rubbing

Certain small or irregular parts of a case must be rubbed by hand. Here a felt rubbing block is used. This block is generally about 1½x1¾x4½-in. and is made of pure white felt. Here again the direction of the stroke must be with the grain of the wood.

In case we have turnings or irregular shaped parts, it has been found that washed burlap makes an excellent rubbing pad. Several thicknesses are padded together and the workman's hand forms the burlap into the differ-

ent shapes. Should the varnish be rough on these turnings it has been found that No. 180 "wet or dry" sandpaper, moistened with paraffin oil, will bring the varnish to an even surface very effectively. This is followed by the burlap pad.

Polishing Out

Some finishes must be polished after being rubbed, and it has been found that the varnished surface should first be rubbed with water and No. FFF pumice stone. After the proper surface has been obtained it should be

Part of rubbing department in furniture factory.

wiped clean with a chamois skin dampened with cool water. This should be followed by a careful rub-out with rottenstone or "pink powders," using a felt block or cheese-cloth pad. This will eliminate the fine hair scratches caused by the pumice stone.

The surface should be cleaned again with a clean chamois skin, after which it can be polished out with any good standard furniture polish, using as a pad the palm of the hand moved in a circular direction. The degree of sheen obtained under this treatment is entirely dependent upon the skill and perseverance of the operator.

As the finish of furniture stands next to design, in importance relative to sales, too much stress can not be laid upon this final stage of the finishing process.

Faulty Foremanship

The man in charge of the finishing department may want to call an employee to account for inferior workmanship, or for some other reason. Often the foreman goes right up to the man while he is engaged at a process requiring close attention. The procedure, of course, is decidedly unwise.

The operator's thought is drawn away further than may be apparent at the time. Whether he is at fault or not, when he is called to task he often takes it to heart, and the immediate work—well, that suffers. Would it not be better judgment never to interrupt a man at work unless conditions make it absolutely necessary?

Then there is the switching of operations to be borne in mind. An operator is called away while right in the middle of a process, to undertake another kind of work. Sometimes another man is placed at his operation—to take up what he should have completed. Is it not better, by far, to have one individual begin and finish a given task, rather than assign different men to it, unless of course, in cases of emergencies? These are questions for finisher foremen to think about. —F. V. F.

One assurance of an improved standard of paint, varnish or lacquer application is found in the use of good equipment for putting it on.

Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Lacquer on Cast Iron

We would like to see some shop hints on japaning, enameling and lacquer finishing over cast iron. —T. N. M. T. Co.

Cleaning Without Acids

We are interested in information on the proper treatment of metals, particularly sheet steel, before painting for removing grease, sand and rust without the use of acids or dioxidine.—N-M Toy Co.

Wax Finishing

We would like to know of a suitable and economical method for wax finishing oak, birch and mahogany, in medium class furniture. We should also like a better class process for more expensive furniture. — W. Ltd., Birmingham, England.

Cloth Polishing Wheels

Will you kindly advise us what kind of cloth polishing wheels are recommended for use in polishing lacquered and varnished goods with furniture wax, to bring them to a high luster for novelty goods?—A. P. M. & Co.

Finishing Toy Furniture

We are making a line of toy furniture mostly of chestnut wood and would like to have the most economical way of finishing our line in quartered-oak stain. We have been using asphaltum cut by gasoline. Could you suggest a cheaper way of making our stain? We would also like to have a cheap imitation of enamel, that we could dip.—W. A. K. Co.

It looks as though you had about the cheapest stain finish that can be made when you have asphaltum reduced with gasoline.

As for an imitation of enamel, you do not state what you are paying for what you are now using and the only thing that would imitate enamel would be a paint. Whether this would turn out cheaper would be a question of the grade you could secure that would dip.—I. F.

Dipping Lead Pencils

We would like to see something in INDUSTRIAL FINISHING on methods of dipping lead pencils or applying enamels, varnishes and pyroxylin coatings to lead pencils.—S. Y. R.

Lacquering Handles

We are using a lacquer furnished by one of the large lacquer producers. The lacquer which we finally decided to use was determined after testing a great many different samples from numerous lacquer suppliers, but it was necessary for us to have a lacquer that would withstand a very severe steam test.

We have just what we want apparently, but we find our costs running so high that its further use is out of the question unless the cost can be reduced in some way. We are dipping our prod-

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uct, which is a shovel handle, but the lacquer dries so quickly that we lose so much of it on the dripping pan.

We are now taking this up with our lacquer people advising them that it is not necessary that this lacquer dry so quickly, in fact, if it would dry within 24 to 48 hours it would be satisfactory, so long as it would stand the steam test. We use the lacquer very thin and of course it is the "thinner" that evaporates so rapidly.

We had in mind trying emersing a long handle fibre brush, which has the bristles sticking out, similar to brushes which you see used for shower baths, these brushes being about 10- or 20-in. long. We thought if this was emersed and then raised up out of the lacquer just while the handle is swabbed around over it, and if part of the handle rubbed against the brush that this might work satisfactorily.

There is one thing that is probably causing us to use so much of the lacquer; the metal stamping of our handle cannot be closed up tightly and, of course, without doubt considerable lacquer gets inside of the stamping and there is a question how much of it drains out. We had thought most of it would drain out because we thin it down very thin. Have you any suggestions?—Handle Works.

Unquestionably a somewhat slower drying lacquer could be produced, but in the effort to produce it some of its wearing qualities might be affected. So far as price is concerned, this process would not tend to make it cheaper, and as you do not give the price you are paying it is difficult to state whether a cheaper article could be turned out or not.

With respect to the method of application this is evidently so complicated a condition that advice based even on the detailed information suggested would be of questionable value. You state that you have tested samples from a great many manufacturers, and as almost all of them must have a practical demonstrator we would suggest that you secure suggestions from them after bringing them to see the shop layout.

It ought to be easy to determine how much lacquer drains out of the handle by a test dip in a small vat, or you might consider the possibility of doing all of the work by brushing if the labor item is not prohibitive.—I. F.

Finishing Toy Cars

We would like some information on the finishing and decorating of toy railway passenger cars, locomotives, etc. Is it more economical or satisfactory to spray, or lithograph, or use decalcomania transfers for this purpose, and should this finish be applied after the metal blanks are stamped out, or before they go into the press? Also what material would be cheapest to use and at the same time appear well on the finished product?

We were considering using decalcomania transfers but would like to have an opinion as to their durability.—C. N. P.

Two distinct methods are used in the finishing of the toys you speak of. The type usually sold to 5 and 10c stores, of thin gauge metal, is lithographed on flat sheets, the design being stamped on, then cut out and bent to the proper shape. Sometimes they

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are varnished and baked over the color ground-coat before being cut and bent, and sometimes afterward.

On the heavier gauges, which are to be shaped and spot welded, the completed toy is dipped in gloss enamel and baked at about 180-degs. for 2½ hours. This makes a one-coat job, as no clear varnish coat is used. Any names or designs are applied with decalcomania transfers, and left natural.

On the lithographed work, transfers are not necessary as the design or name is usually stamped on as part of the lithographing process. Wherever the object is to be dipped it must be of the proper shape to drain off readily. Sometimes it is dipped and then pockets not reached in the dipping process are sprayed.

We do not know of any toys being finished complete with lithographing, but it may be possible that certain kinds may be so treated. The decalcomania transfer manufacturers could undoubtedly supply you with up-to-date information on this point. It is of course perfectly possible to apply transfers to lithographed work and then varnish over, but this would not be as cheap as having the lithograph perform the entire process. Transferred work should possess satisfactory durability if varnished over.—I. F.

Glued-up Ash Doors

We would appreciate it very much if you could advise us the proper way to finish glued-up ash, doors, where the glue joints are exposed. This ash will be used outside where it will be exposed to the weather, and what we wish to do is to finish it in a light brown without using varnish and at the same time have it weather proof so that the rain and cold weather will not affect the glue joints.—P. G. M. & Sons.

Your letter does not state what type of glue was used; if of the waterproof variety it will be possible to use a coal-tar shingle stain or creosote wood-preservative of appropriate shade.

If waterproof glue was not used it will be necessary to apply a complete finish including varnish. It would be possible to trace the glued joints with varnish were it not for the fact that water will seep through the wood at the sides and eventually disintegrate the glue.—I. F.

Air Compressor News

It is reported that the new Worthington vertical "feather-valve" air compressors were designed to meet requirements for a small high-grade machine for use in spraying paint and other applications requiring the use of clean compressed air. Two types are made: air-cooled in 2½ x 3-in., 3⅛ x 3-in. and 3½ x 4-in. sizes, and water-cooled in four sizes up to 6½ x 6-in.

Realizing that excessive heat generated during compression enables the air to retain much moisture and oil in vapor form, thereby causing the lacquer to "blush", or refuse to dry, the manufacturer has given special attention to the effective cooling of the compressor cylinder and to the elimination of oil in the discharge air.

In the air-cooled compressor the radiating surface is unusually large, while in the water-cooled compressor the entire cylinder with heads and valves is submerged in a large water jacket so

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constructed as to insure free circulation of the cooling water to all parts of the cylinder. Because of the more effective cooling made possible through the use of circulating water, the water-cooled compressor is especially suited for fine paint and lacquer applications.

Excess oil in the air is avoided through the use of force-feed lubrication and special piston construction which wipes surplus lubricating oil off the walls and returns it to the crank case.

Automobile-type construction was adopted in designing Worthington vertical compressors so as to obtain the long life, low upkeep and reliable service which characterizes the high-speed reciprocating machinery of the modern automobile. Accordingly pressure force-feed lubrication and accurate balance of reciprocating parts were incorporated in the design. These two features, together with the use of "feather" valves, are largely responsible for the smooth, efficient operation and long life claimed for the new compressors made by the Worthington Pump & Machry. Corp. of New York City.

Preparing Zinc and Galvanized Iron For Paint

In addition to the methods given in recent issues of INDUSTRIAL FINISHING, for treating zinc sheets for sign painting, I give herewith some others that have been in use with sign painters for many years, with others of various kinds. I take it that galvanized iron is included under the name of zinc sheets, though the two are not identical; still, the treatment for one does for the other.

The Government specifies simply strong vinegar. Railroad companies do considerable painting on galvanized iron, and their master painters—some of them at least—first wash the surface with gasoline or benzine, to re-

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move grease; then apply a coat of coach finishing varnish.

Some master painters of car shops add some finishing varnish to the first coat of paint applied over the above surface. Some wash off with benzine and then apply a coat of iron paint, made thin and well brushed out. The iron paint is mixed with boiled oil. It is claimed that paint has never been known to scale from this "ground".

The master painter of a ferry boat and railroad company tells me that he has tried vinegar and various other acids; also a mixture of acids and chemical salts, and that they "have given fair but not uniform results". There was much peeling-off of the paint with them as without them, he added. Another painter says that he did a job of painting on galvanized iron 25 years previously, priming with French yellow ochre, and following with two coats of English lead, sandpapering each coat. In 25 years no peeling has occurred.

The doctors do not always agree. Now, ochre is the worst primer for wood that we have. Paint will scale from it. A paint chemist states that a size of white wine vinegar, followed with one coat of spar varnish thinned with turpentine, is effective. The first coat of paint applied over this should be mixed rather flat with turpentine.

Once the architects specified three coats for galvanized iron, the second and third to be sandpapered. This was too much paint. Such surfaces should have as little paint as will suffice. The fewer coats the better, and each

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coat should be well rubbed out, using a rather thin paint. It is my contention that neither white lead nor zinc white are safe on zinc or galvanizing.

Satisfactory washes or sizes are as follows: Take 2 oz. each of copper chloride, copper nitrate, and sal ammoniac. Mix with one gallon of water, in a non-metallic vessel. Apply one coat with a broad bristle brush. When dry it will appear black, but it soon turns gray. A gallon will cover about 25 to 30 squares of 100-sq. ft. each. It is easily applied and quite inexpensive.

Another method, preferred by some because it is easier to prepare, consists in applying this wash: To a gallon of water add 6-oz. copper acetate. This gives a coating of black copper oxide.

Some technical writer says that the scaling of paint from galvanized iron is caused by electricity, and that the white powder found beneath the paint is zinc oxide, the result of electricity. Thus various reasons are given for the failure of galvanized iron to hold paint. One very plausible reason is that the use of sal ammoniac in the galvanizing process causes the formation of a thin film of the basic chloride of zinc on the surface of the metal being galvanized. This substance, being of a hydroscopic nature, acts as a repellant to prevent the close adherence of the paint to the metal, and the paint dries as a skin over it.—A. A. K.

Paint for Radiators

For years it was a general idea among the trade that only a metallic paint could be used on radiators. However, it has been proven by building experts that paint will hold the heat longer. The report from recent experi-

ments reveals that the aluminum or bronze paint generally applied to radiators greatly reduces their effectiveness and makes it necessary to provide larger surfaces to obtain the same heating effects.

The heat from a metallic painted radiator surface is about a third less than that emitted by a bare radiator of the same size, or one painted with non-metallic paint.

On the other hand, aluminum paint is a very effective means of reducing the amount of heat transmitted through a thin material. Applied to the under side of a tent or awning it reduces by three-fourths the amount of heat that comes through the cloth. Used on the cover of an automobile or ice wagon it cuts in half the heat that is let through, consequently it makes the temperature inside the vehicle more nearly the same as what prevails in the natural shade.

The use of paint makes possible the decorating of radiators for neater appearance and enables one to bring them into closer harmony with the color scheme of the room. The radiators can be matched to the woodwork or the walls. If the walls are papered, the radiators may be made to blend with the paper.

The flat wall paints of today will stand the intense heat of a hot water boiler without peeling or blistering. Most of the well known brands of high-grade white paints of this nature will stand for at least two years without becoming a yellowish cast. It is best to leave the finished work in "the flat", or dull gloss rather than to use enamel.—J. K. Cooper.

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A Quick-Drying Putty

A quick-drying putty, and one that can be sanded to a fine finish the following day, can be made by mixing together equal parts dry white lead and whiting, with the right percentage of quick-drying varnish. Unless one has a machine for grinding these together, they should be well beaten with a mallet to reduce all the lumps and get the correct degree of fineness.

This putty, except what is required for immediate use, should be kept submerged in a vessel of water to exclude the air and prevent it becoming hard; in this way it will keep indefinitely.

The above putty is not recommended for glazing windows, though it may be used for that. Its chief advantage is for filling holes, where a level surface is desired, for paint. It is specially good for filling nail holes in interior trim, where a high-class finish is desired, as there is no danger of it shrinking after the finishing has been done.

For use under paint and enamel finishes it is not necessary to color it. However it can be colored, at the time of making, by mixing with it the proper coloring matter ground in japan. It is recommended that the coloring matter be ground in japan since it is more finely ground in japan than in oil. The japan, being a drier, will assist rather than retard hardening of the putty when used.

Another quick-drying filler for holes, and one which hardens more quickly than the above, can be made by mixing silex or whiting into a paste with shellac. As this will harden very quickly when exposed to the air, and will not keep for any great length of

time in water, it is advisable to make it only in such quantities as are required for immediate use. This paste will do all its shrinking and hardening within two hours, after which it can be sanded smooth and coated over.

A splendid filler for holes in any kind of wood, especially in walnut or mahogany, is made as follows: Take a quantity of sawdust of the same kind of wood as that on which it is to be used, and soak it in a weak stain of the same kind of stain as will subsequently be used in finishing. After soaking for a few hours drain off the stain and spread the sawdust out to dry. When dry, prepare a solution by dissolving one ounce of good glue in one pint of hot water. Into this glue sufficient stained sawdust to make a paste.

When it is used, this filler paste should be pressed firmly into the holes and it should be raised a little higher than the surrounding wood to allow for sanding. If the paste is made right and used right, there is little danger of the defect it hides ever being discovered, once the surface is finished.—X. Y. Z.

Making Brown Shellac White

First of all, the orange shellac must be pure and unadulterated —made of the best grade of gum. The best shellac contains the least amount of impurities. Orange-colored shellac can be so treated as to remove the color and leave a colorless or white gum shellac. This may be done in various ways, the following being one method: Boil the orange shellac in a weak solution of carbonate of potash, and when dissolution has been accomplished collect the shellac, melt it under water, and while it is soft pull it until it has a satiny appearance.

Another way is to boil the shellac in a weak solution of potash, and while it is in a melted state pull and work it until it is white enough to suit. Then again melt it and pull it in clear warm water. These two methods are for

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$2.00 extra for red light current heat indicator attached. F. O. B. Chicago.

Furniture Patchers' Knives, $.55; Furniture Patching Cement Sticks, $1.75 per dozen; Furniture Patching Transparent Sticks, $2.00 per dozen.

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815 E. 43rd St., Chicago, Ill. Tele. Oakland 1252

small quantities. On a commercial scale the process is, of course, more tedious, requiring at least a dozen operations.

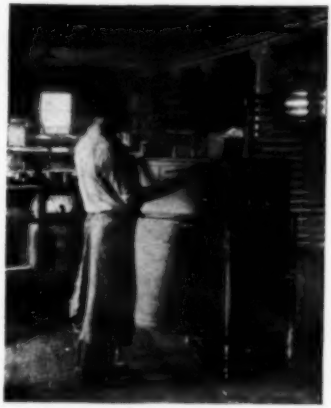
Here is a shop method, where a small quantity is required: Dissolve 1-lb. of orange shellac in 2-lbs. of strong alcohol, and leave it in a warm place for a few days. Then prepare a mixture of 1-lb. of 20 percent bleaching powder with 3-lbs. of water; filter through a linen cloth and wash the residue with ½-lb. of water, the two waters being united and mixed with 33 percent aqueous solution of potash until no further precipitate is formed, 4½-oz. of potash usually being enough per pound of bleach.

The filtrate from this treatment is stirred into the warm solution of shellac, and at the end of 30 minutes sufficient hydrochloric acid to produce a decided reaction, whereupon the shellac will be deposited as a perfectly white mass. This is removed from the liquid and washed with boiling water until the washing ceases to run off milky. The shellac is then molded into strips which are dried in the sun and open air. The acid liquor, being neutralized with quicklime, can be distilled to recover the alcohol.—Munell.

Matching Special Colors

For several years certain furniture manufacturers have made a specialty of painting and decorating their goods according to customer's orders. Colors are blended to harmonize with room furnishings. This work is tedious; it involves not only a great deal of patience and painstaking labor, but it requires skill and a good eye on the part of the finisher.

Whoever is entrusted to this work should have a knowledge of colors and color blending. Otherwise some of his work will be "off color", and he is very apt to use five gallons of material where only one is needed.



Great care is required to match colors for special finishes.

In this work, start with a very small quantity of color to be mixed, and work up to what you want, leaving enough to be used later for possible touching-up or repairing. It is always a good plan to keep a little left-over color on hand for a few weeks, or until after the goods have been received and accepted by the customer.

If the color is flat and is to be coated over with shellac or lacquer, you must allow for this by making it slightly lighter; the shellac or lacquer will make it a trifle darker. In a case of this kind it is a mark of good judgment to first try some of the color on a test panel, let it dry and coat it with whatever clear finish is to be used on the work. Make one, or if necessary, more

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than one, trial to get exactly the tint, shade or hue of color you are matching. As for enamel, all that is needed is to mix until you get the color you wish to match.

When you have a special tint, shade or hue of color mixed, and you need more of it, the one and only sure way to match it is to try samples of both on one side of a plate of clear glass and then turn the glass over so you see the colors through it.

When large quantities of a stock color are used and mixed repeatedly, the only sure way to preserve the true uniform color is to use the same materials every time and mix by exact weights. Formulas for each tint, shade and hue of color mixed should be accurately recorded in a book for future reference. Even though these apparently go out of style as time goes on, there is always the possibility of some old color being required to match goods formerly ordered. Reference to the formula will save time, material and patience.—J. K. Cooper.

Relation of Sanding To Finish

Sometimes, when staining a piece of wood that has been band-sawed and spindle-sanded, the finisher has difficulty getting the stain to take. The same thing is often true of carvings. The reason why stain does not take is because the surface is too smooth. Perhaps this requires some explanation.

Some wood carvers pride themselves on making perfectly clean cuts, and they object to having their work sanded, on the ground that sanding is apt to affect the perfect contour and symmetry of the outlines. Such might be the case if the work is not done by an expert. But, in view of the fact that an extremely smooth, clean cut does not leave a particle of anything resembling fuzz to absorb stain, it is my contention that carvings should be lightly sanded to enable the stain to "take hold" in the wood. The thing works on the principle of hard and soft woods.

Every stainer knows that the same stain will produce a darker effect on basswood than it will on hard maple. Or, take a piece of quartered oak and observe how much darker are the soft porous parts of the wood after staining, than are the flakes. It is simply a matter of how deeply the stain penetrates the wood.

Here is an experiment which anyone can try to prove my contention: Sand the surface of a board; then take a shaving off a part of the surface with a plane, and apply a coat of stain. The part that was planed will show considerably lighter in color than the part that was sanded.

The reason why scrolls that have been sanded with a spindle-sander are lighter, is, in many instances, because the sandpaper was too much worn. The surface was not so much sanded as it was polished by friction with paper. The difficulty may be solved by getting after the sanding department, and insisting on the work being done more uniformly. The kind of work performed in the sanding department has considerable bearing on what can be done in the finishing department. Unless the sanding is uniform, the finishing may show variations in depth of color.

While it is not possible to be always using new, sharp sand-

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paper, there is no good reason why the sandpaper should be allowed to become so badly worn that it polishes by friction to a hard, smooth surface. More than once have I been forced to bring the foreman of the sanding department to the finishing room, and point out to him the effect which sanding has on the finish. As a rule these men are reasonable, and will correct such matters when the conditions are brought to their attention. With many of them, the difficulty is they do not know, nor have they any means of knowing unless they are shown.—Carl M. Raymond.

Interesting Facts About Effect of Colors

In choosing paints for oil tanks many factors must be considered. Probably the three most important are cost, protective value, and color. Many companies have adopted a standard color for all of their tanks. In this way they reduce the initial costs of paints by buying in large quantities. The tank farms of such companies usually have a neat appearance, resulting from the uniform painting of all tanks. This procedure also has advertising value.

Unfortunately, most of the paints used to protect steel are of the darker colors, usually red or black. These colors accelerate the rate of evaporation. Several companies have solved this difficulty by using a dark colored metal-protective paint as a primer coat, and a paint of any desired color for the final coat. Special metal-protective primers to be used under light-colored cover coats have been placed on the market by several paint manufacturing companies.

The temperature of oil in storage tanks is influenced largely by heat received from outside sources by radiation. The main source is the sun. Radiant heat waves are similar to light waves in that they are reflected, absorbed and refracted. Therefore, when radiant waves fall on a body, one portion is reflected, another portion is absorbed and, if the body or matter is very thin or transparent, a part is transmitted. The nature and color of a body determines the extent to which it is heated by the absorption of radiant waves.

Many laboratory tests have been made in order to determine the effect of color upon the absorption and reflection of radiant waves. These tests indicate the desirability of painting storage tanks, for gasoline and crude oil of high gasoline content, with a light color.

A test was conducted on four tanks painted black, red, gray and aluminum. The results of the test clearly show the value of light-colored paints for tanks containing gasoline, or crude oil of high gasoline content. These results are believed to be conservative, and under slightly different conditions the differences between the results obtained with the light and dark colored paints would doubtless be more marked.

Although this test was not conducted primarily to determine the lasting qualities of the various tank paints, an inspection of the paint was made after the test and, as far as the writer could determine, the paints on all of the tanks were in about the same condition. This point is of material importance to the operator, for

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many consider that light paints do not have the wearing qualities of dark tank paints.

These tests indicate that the saving with the light paint, approximating 200 barrels per year per 55,000 barrel tank, would warrant giving the tank one color coat every year if necessary. In fact the writer has been informed by several refiners that it is customary for them to give each of their gasoline tanks one color coat every spring, and that the saving in evaporation more than pays for the additional cost. The writer has noted several instances where light colored paints have held up for several years without losing the original color.—L. Schmidt.

Keeping Oak Floors Light

Many finishers have difficulty in finishing oak floors light enough to suit the tastes of those who demand that they be finished natural. Oak floors must be filled, and unless something is done to protect the wood, the oil in the filler will darken the wood considerably beyond its natural color.

To overcome this difficulty, apply to the floors a coat of white shellac dissolved in alcohol, or wood alcohol, the shellac being not heavier than 1½ lbs. to a gallon of solvent. A coat of very thin, pale colored lacquer is even better than the shellac, provided it can be obtained pale enough.

The lacquer is not more effective than the shellac in preventing coloration of the wood, but it is a much tougher and supplies a better foundation for the subsequent coats of finishing material. If the work is carefully done, the surface may be sanded with very fine paper prior to filling; but if the shellac or lacquer is to serve its purpose it must not be cut through by this sanding operation.—L. M. J.

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